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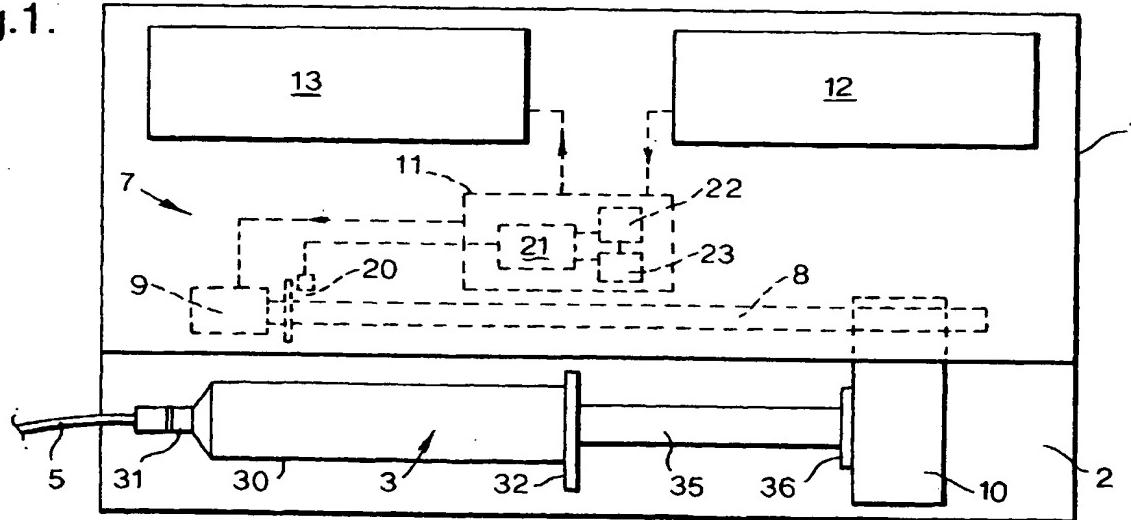
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### (54) Syringe pumps

(57) A syringe pump has a motor 9 rotating a lead-screw 8 to drive a plunger head actuator 10 along it. The head actuator 10 engages the plunger 35 of a syringe 3 and moves the plunger along the syringe barrel 30 to dispense medication. An optical encoder 20 mounted on the leadscrew 8 is rotated by the motor 9 to produce a pulse output. A control unit 11 times the interval be-

tween the pulses and compares these timings with a stored value representative of a predetermined multiple of the minimum time. If the head actuator 10 is obstructed, the speed of rotation of the motor 9 is slowed and the time interval between pulses rises. When this exceeds the stored value, the control unit 11 stops the drive to the head actuator 10 and generates an alarm.

Fig. 1.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 01 30 6561

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 5 176 502 A (SANDERSON GEORGE G ET AL) 5 January 1993 (1993-01-05) * column 8, line 64 – column 9, line 6; claim 1; figure 4 * * claim 4 * * column 10, paragraph 3 * * column 8, paragraph 2 * * column 8, line 8 – line 21 * * column 9, line 19 – line 22 *	1-8	A61M5/145
X	US 4 952 205 A (MAUERER ERICH ET AL) 28 August 1990 (1990-08-28) * column 1, line 52 – column 2, line 41 * * column 3, line 9 – column 3, line 49 * * column 4, line 19 – column 4, line 24; figure 1 *	1-4,6,8	
X	US 4 833 384 A (MUNRO DONALD F ET AL) 23 May 1989 (1989-05-23) * column 1, line 41 – column 1, line 62 * * column 3, line 10 – column 3, line 30 * * column 4, line 20 – column 4, line 23 * * column 4, line 39 – column 5, line 45; figures 1-4 *	1-6	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A61M
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The present search report has been drawn up for all claims			
Place of search <b>MUNICH</b>		Date of completion of the search <b>17 July 2002</b>	Examiner <b>Reinbold, S</b>
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on or after the filing date D : document cited in the application L : document cited for other reasons S : member of the same patent family, corresponding document			

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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